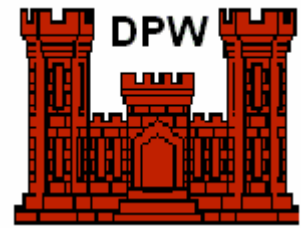




ENERGY EFFICIENT TECHNOLOGIES

ARMY ONLY DAY



presented by

DIETER GERBER, PE, CEM

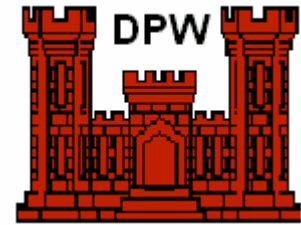
CHIEF OPERATION&MAINTENANCE DIVISION,

ENERGY MANAGER

USAG BAMBERG, GERMANY



ENERGY EFFICIENT TECHNOLOGIES ARMY ONLY DAY

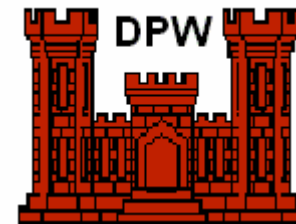


AGENDA

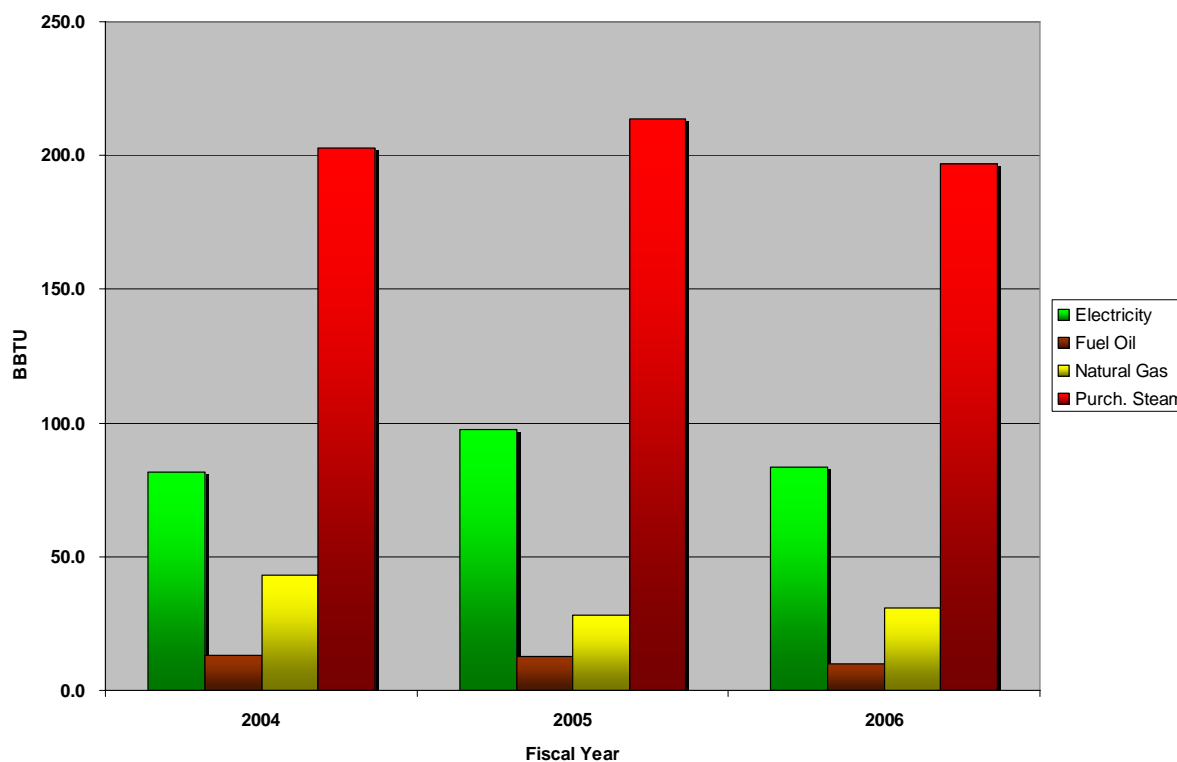
- *OVERVIEW*
 - *ENERGY DATA*
- *ENERGY PROJECTS (PLANNED-COMPLETED)*
 - *NEW HEATING PLANT WB IV*
 - *COMBINED HEAT AND POWER GENERATION*
 - *SMALLER PROJECTS*
- *PROBLEMS, OBSTACLES, ISSUES*
- *QUESTIONS*



ENERGY EFFICIENT TECHNOLOGIES ARMY ONLY DAY



Energy Consumption USAG BAMBERG



ENERGY TYPES

ELECTRICITY 26%

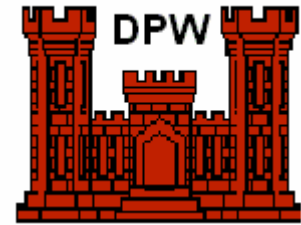
FUEL OIL 3%

NATURAL GAS 10%

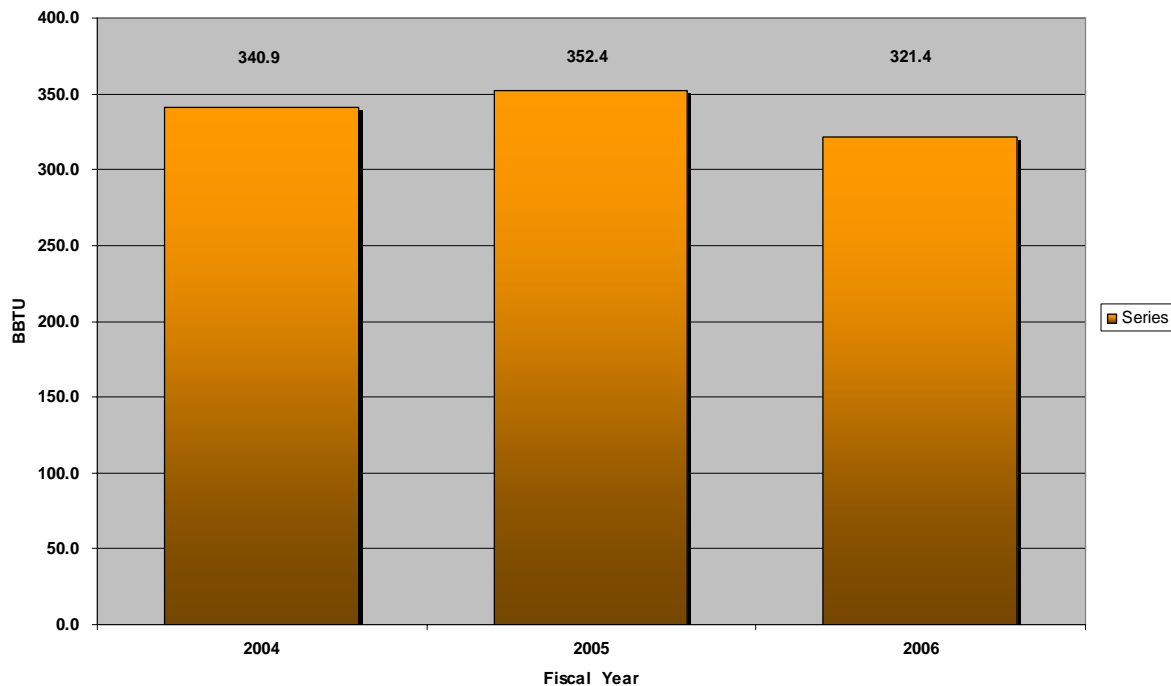
DISTRICT HEAT 61%



ENERGY EFFICIENT TECHNOLOGIES ARMY ONLY DAY



Total Energy Consumption



TOTAL ENERGY CONSUMPTION

FY 05

362 BIL BTU

FY 06

321 BILL BTU

SAVINGS

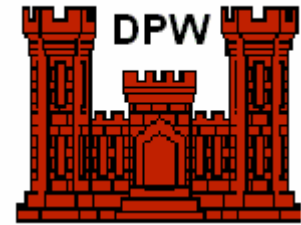
41 BIL BTU ~ 11 %

AVOIDED COSTS

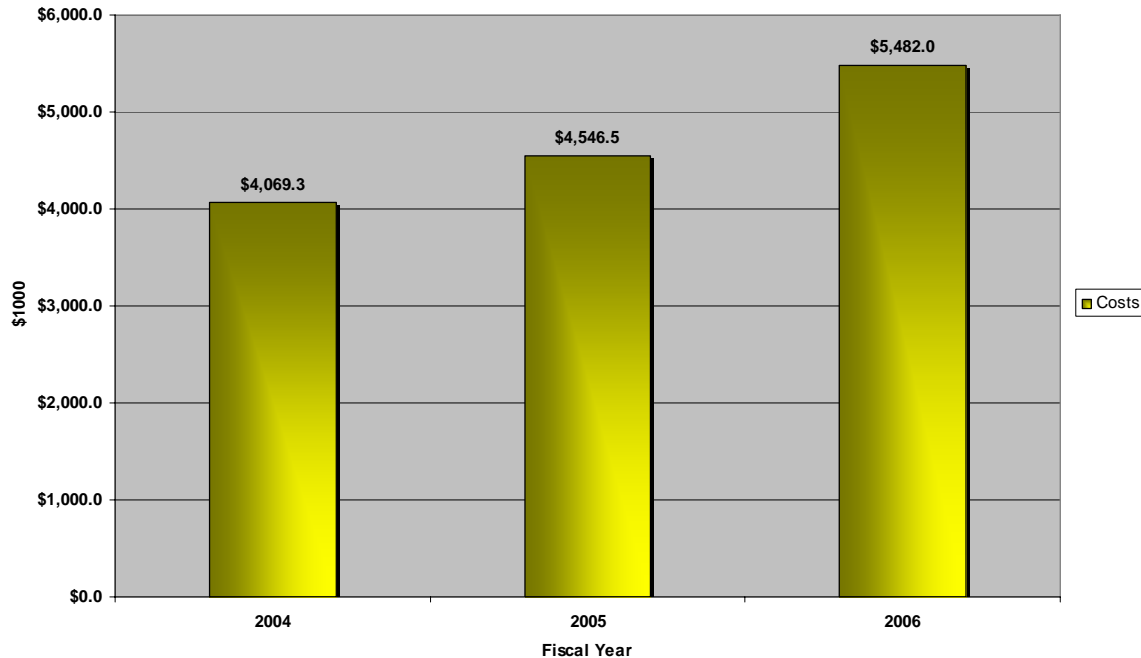
~ 530 K\$



ENERGY EFFICIENT TECHNOLOGIES ARMY ONLY DAY



Costs



TOTAL MONEY CONSUMPTION

FY 04 4,069 K\$

FY 05 4,546 K\$

FY 06 5,482 K\$

INCREASE OF COSTS

FY 04 - FY06 ~ 42 %

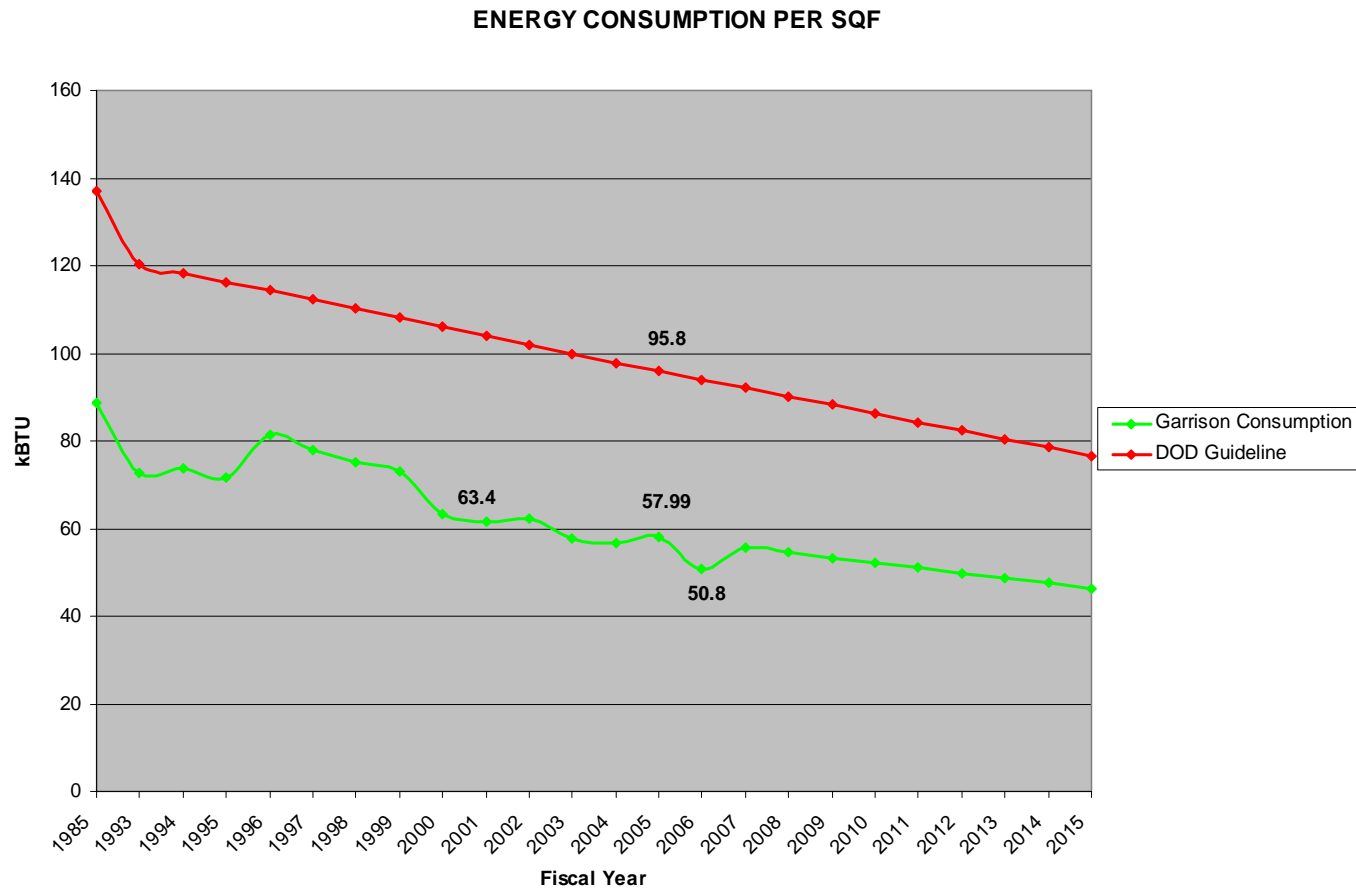
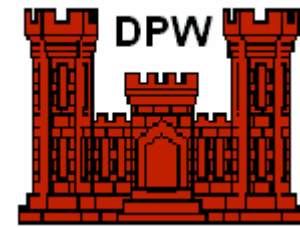
DECREASE OF ENERGY CONSUMPTION

FY 04 – FY 06 ~ 11%



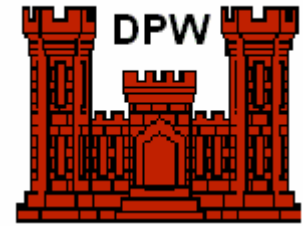
ENERGY EFFICIENT TECHNOLOGIES

ARMY ONLY DAY





ENERGY EFFICIENT TECHNOLOGIES ARMY ONLY DAY



NEW HEATING PLANT WB IV

- **COSTS:**

150 K\$

- **ENERGY SAVINGS (CALCULATED)**

20 K\$ PER YEAR

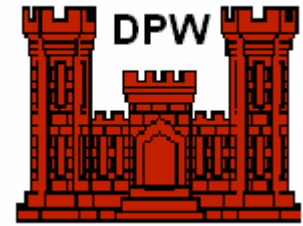
- **SIMPLE PAY BACK:**

7.5 YEARS





ENERGY EFFICIENT TECHNOLOGIES ARMY ONLY DAY



NATURAL GAS FIRED BOILER
MAX SUPPLY TEMPERATURE
120 C OR 248 FAHRENHEIT

NEW HEATING PLANT WB IV

- *FINANCED WITHIN PRIVATIZATION CONTRACT*

- *DESIGN AND CONSTRUCTION TIMEFRAME:*

START DESIGN:

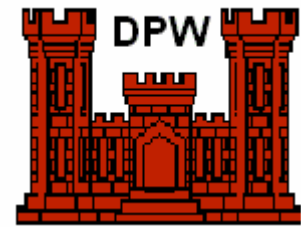
JANUAR 06

END OF CONSTRUCTION:

SEPTEMBER 06



ENERGY EFFICIENT TECHNOLOGIES ARMY ONLY DAY



HEAT AND POWER COGENERATION (PLANNED)

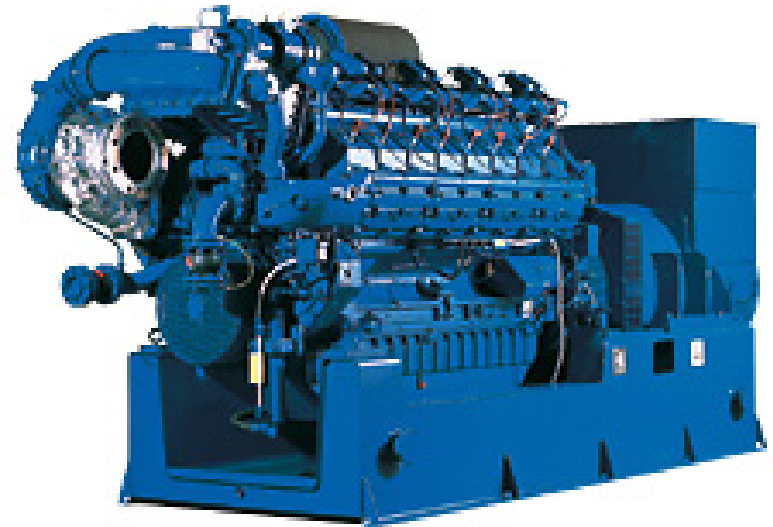
•FEASABILITY STUDY:

- RUNTIME*
- HEAT DEMAND IN SUMMER TIME*
- LOAD TRACKING (HEAT AND ELECTRICAL)*

•ENERGY SAVINGS (CALCULATED)

*LOAD REDUCTION
50 K\$ PER YEAR*

*POWER AND HEAT PRODUCTION
100 K\$ PER YEAR*



COSTS:

INVESTMENT:

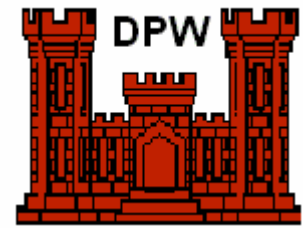
350 K\$ - 500K\$

MAINTENANCE

20 K\$ PER YEAR



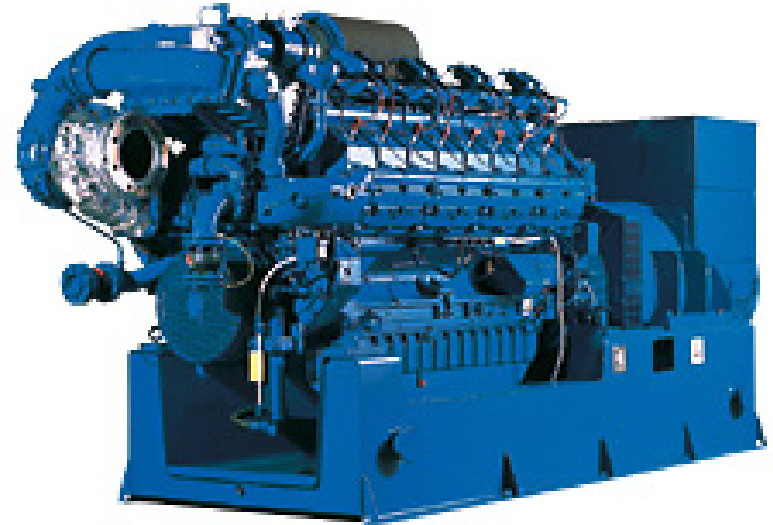
ENERGY EFFICIENT TECHNOLOGIES ARMY ONLY DAY



HEAT AND POWER COGENERATION (PLANNED)

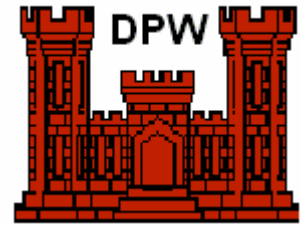
•PROBLEMS:

- PAY BACK TIME
- EXISITING POWER
PROCUREMENT CONTRACT





ENERGY EFFICIENT TECHNOLOGIES ARMY ONLY DAY



HIGH EFFICIENCY PUMPS

***PERMANENT MAGNET MOTOR
VARIABLE SPEED***

POWER SAVINGS:

UP TO 80%

***COMPARED TO A NORMAL PUMP
WITH FIXED SPEED***

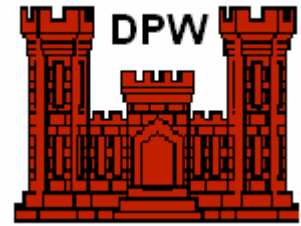
SIMPLE PAY BACK:

3 TO 4 YEARS

DEPENDING ON RATES



ENERGY EFFICIENT TECHNOLOGIES ARMY ONLY DAY



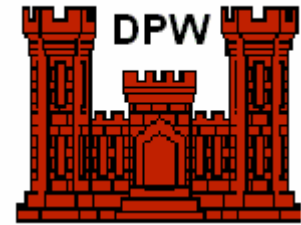
INTERIOR LIGHTING

USE OF:

- ***T5 INSTEAD OF T8 LIGHTS***
- ***ELECTRONIC BALLASTS TO OPERATE T5 LIGHTS***
- ***SAVES UP TO 25% OF POWER COMPARED WITH T8 LIGHTS***



ENERGY EFFICIENT TECHNOLOGIES ARMY ONLY DAY

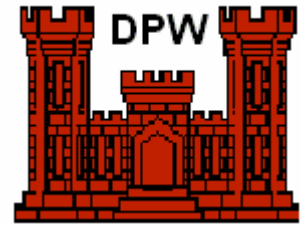


FUTURE OUTLOOK FY 07 / 08

- | | |
|--|--------------------------|
| • <i>IMPLEMENT METERING</i> | <i>2-3 QUARTER FY07</i> |
| • <i>CHECK SETPOINTS OF THE HEATING SYSTEM</i> | <i>RECURRING</i> |
| • <i>IMPROVE MUNA HEATING SYSTEM</i> | <i>TBD</i> |
| • <i>INSTALL SOLAR PANELS AT HEATING PLANT</i> | <i>3-4 QUARTER FY 07</i> |
| • <i>INSTALL HEAT AND POWER COGENERATION</i> | <i>FY 08</i> |



ENERGY EFFICIENT TECHNOLOGIES ARMY ONLY DAY



PROBLEMS, OBSTACLES

- *INFORMATION FLOW*
- *WAY OF FUNDING*
- *DATA NORMALIZATION*